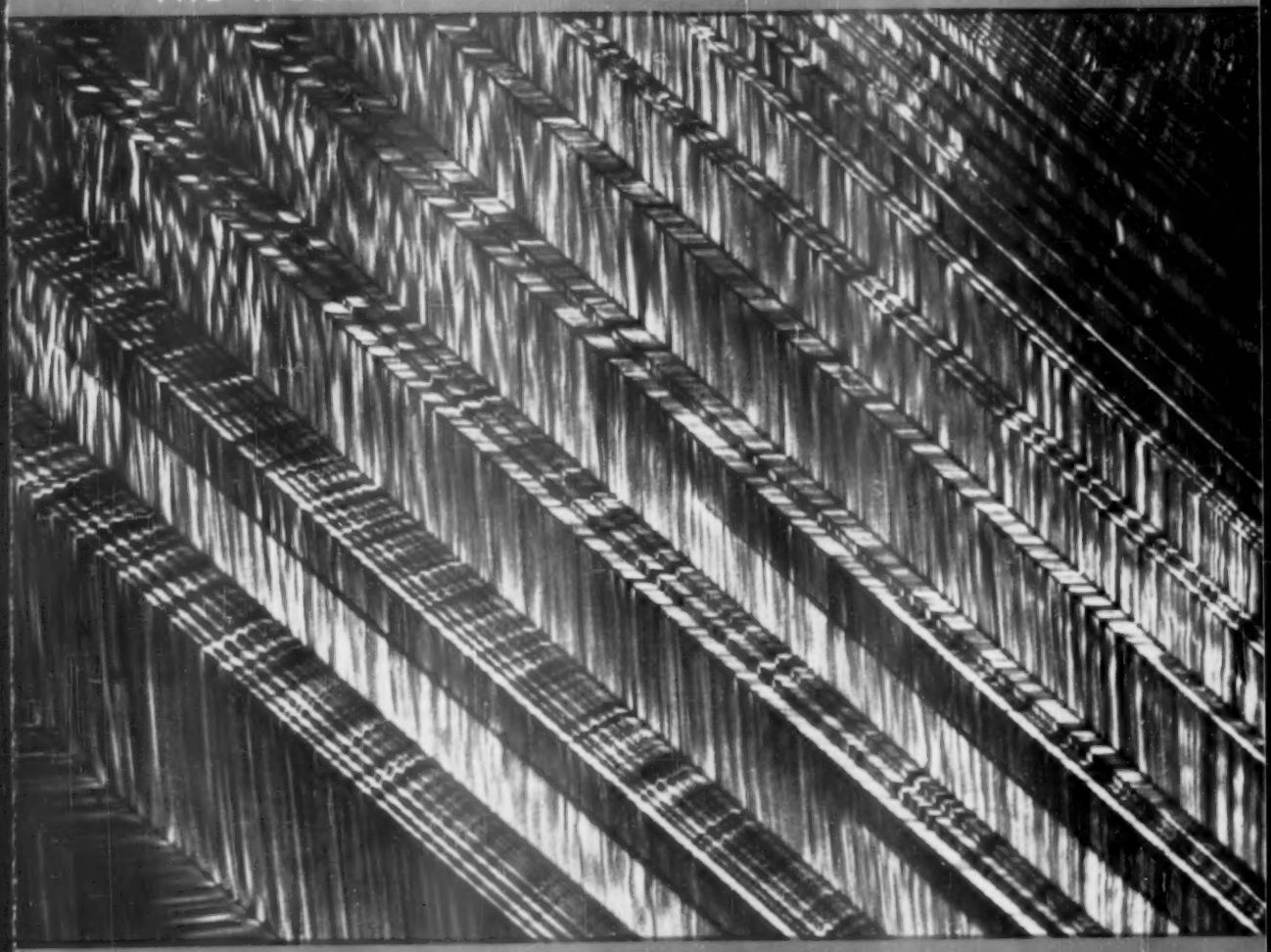
15¢
$5.50 A YEAR

December 4, 1954

VOL. 66, NO. 23 PAGES 353-368

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Single Crystal

See Page 360

A SCIENCE SERVICE PUBLICATION

SURGERY

Life-Saving "Thimbleful"

A small amount of blood, delivered every minute to critical areas of heart, can prolong lives of those threatened with heart mechanism failure.

▶ AS LITTLE as a "thimbleful" of blood can be lifesaving in some circumstances, it is reported in the *Journal of the American Medical Association* (Nov. 27).

The small amount of blood, delivered every minute to critical areas of certain ail-

[redacted]

of blood which protects the coordinating mechanism and saves life.

In one operation, the heart is stimulated by an irritating agent such as powdered asbestos, and tissue and fat are grafted to the heart surface. In the other operation, a vein graft is connected to a channel leading into the heart and the channel is later pinched in to raise pressure.

The techniques are actually ways of helping the heart in its own attempts at defense against occlusive disease. Diseased hearts ordinarily try to develop additional circulation themselves, but sometimes this development is slower than the progression of the disease. An operation performed before the disease reaches a crisis helps insure the auxiliary blood supply.

For this reason, the operations can be done only on those patients whose vessels have become plugged, and defenses are developing, but in whom an occlusion crisis has not occurred.

Best suited for the operations are lean persons who have had the [illegible], have pain, but are [illegible]. Patients with heart [illegible]ted heart muscle are [illegible]ration.

Science News Letter, December 4, 1954

Eat [illegible]ales

[illegible] has exhibited a very [illegible] fish scales.

[illegible] cousin, the sunfish, [illegible]ble at white bread [illegible] for bait, this African [illegible]nose at earthworms, [illegible]ts in favor of plain [illegible] living fish.

[illegible] several Tankanyika [illegible] and are reported in [illegible] G. Marlier and N. [illegible]nyika Laboratory at the Institute for Scientific Research in Central Africa, Uvira, Belgian Congo.

The scientists state that the fish, when it succeeds in attacking another fish, pushes its mouth against the back of its victim and removes the scales. It is hoped that continued study of the fish will solve some of the mystery as to the origin and reasons for his peculiar diet.

Science News Letter, December 4, 1954

ICHTHYOLOGY

Tropical Knifefishes Give Off Electricity

▶ KNIFEFISHES INHABITING the fresh tropical waters of Central and South America, close relatives of the electric eel, have been found to emit low intensity electrical pulses when moving.

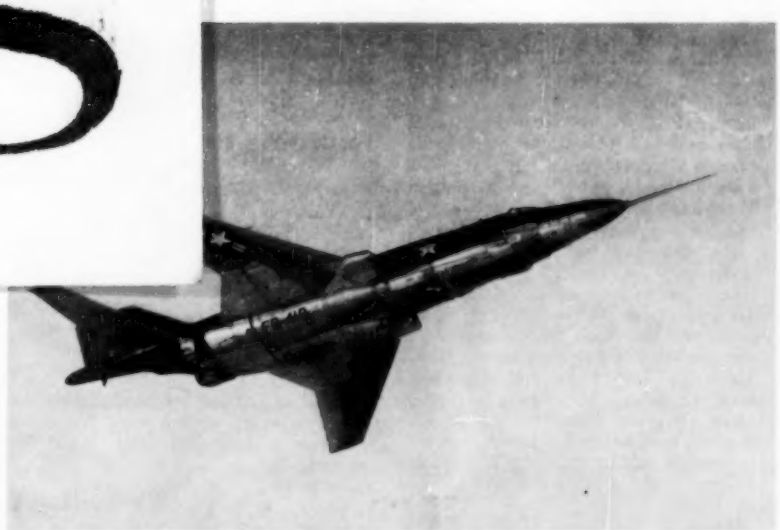
Unlike the eel, which emits single or short bursts of pulses of high intensity, the knifefish emits low intensity pulses continuously and with regularity.

The electricity-producing organ identified by Dr. C. W. Coates of the New York Zoological Society and Profs. M. Altamirano and H. Grundfest of the College of Physicians and Surgeons, Columbia University, is described in *Science* (Nov. 19).

Heretofore, it was thought that the electrical pulses originated in the muscles.

The scientists also found that the discharges are most likely centrally controlled from the brain. When at rest, the knifefish emits no detectable electrical activity. Although the significance of the pulses is unknown, it has been suggested that these discharges serve as the fish's radar, orienting it with regard to obstacles.

Science News Letter, December 4, 1954



F-101 VOODOO—Believed to be one of the world's most powerful fighter airplanes, the F-101 Voodoo was developed for the U. S. Air Force by McDonnell Aircraft Corporation. It is in the supersonic class and capable of carrying atomic weapons. It can be refueled in flight. The plane will be used by the Strategic Air Command.

At Last! A Complete Professional Telescope For Amateur Astronomers

The 4 Inch DYNASCOPE Reflector

Reg U S Pat. Off.

At an unbelievably low price!

• A Parabolic Mirror! • 4 Power Finder!

• 3 Achromatic Eyepieces, 65X—130X—167X • Folding Tripod!

FEATURES:

1. *4 inch Parabolic Mirror Aluminized plus Zircon Quartz layer*
2. *3 Eyepieces—(1) 65X Huygen (2) 130X—167X Achromatic Ramsdens*
3. *Rack & Pinion Focusing*
4. *4-power Achromatic Finder Scope*
5. *Non-Friction Equatorial & Alt-Azimuth Mount Combination*
6. *Bakelite Tube*
7. *4-point Tube Suspension*
8. *Tripod with Hardwood Folding Legs*

ONLY

$44.95

F. O. B. Hartford, Conn.

Shipping Weight 9 lbs.
Express charges collect

• You will be truly amazed at the scientific accuracy and technical engineering built into this complete reflecting telescope. If you were to purchase the parts and assemble them yourself, you would spend much more than the unheard of low price of this precision instrument. And in building your own telescope you could never hope to attain the accuracy and co-ordination of parts which have been engineered into the Dynascope.

• The high resolving power of the parabolic mirror produces exquisite definition which clearly separates such celestial phenomena as double stars. The 4-inch mirror gathers ½ more light than a 3½-inch mirror. The Dynascope parabolic mirror is aluminized and then coated with a layer of zircon quartz for maximum protection and lasting use. A parabolic mirror of such quality has previously been obtainable only in high-priced instruments.

• The Dynascope assembly includes everything—there is absolutely nothing else to buy. There are no added charges for extra eyepieces—or a view finder.

• The tripod with hardwood folding legs is fitted with position locks for absolute stability. Study the list of features and you will agree that this unprecedented offer is the most generous and all-inclusive you have ever seen anywhere. The usual Criterion money-back guarantee applies and, in fact, if you can duplicate this instrument for less than twice our unheard of low price, your money will be refunded at once. With a precision instrument like the Dynascope Reflector, production is necessarily limited but we can make immediate shipment at this time. Send check or money order now with full guarantee of satisfaction.

• NOW YOU CAN HAVE A REFLECTING TELESCOPE OF PROFESSIONAL CALIBER FOR ACCURATE ASTRONOMICAL OBSERVATION!

• THE ONLY TELESCOPE AVAILABLE FOR UNDER $100 WITH A PARABOLOID MIRROR, RACK & PINION FOCUS, AND 3 ACHROMATIC EYEPIECES!

Manufacturers and Distributors of Optical Instruments

THE CRITERION MANUFACTURING COMPANY

331 Church Street • Hartford 1, Connecticut, Dept. SND7

Telephone: CHapel 7-1696 • Cable Address: CRICO

SURGERY

Life-Saving "Thimbleful"

A small amount of blood, delivered every minute to critical areas of heart, can prolong lives of those threatened with heart mechanism failure.

➤ AS LITTLE as a "thimbleful" of blood can be lifesaving in some circumstances, it is reported in the *Journal of the American Medical Association* (Nov. 27).

The small amount of blood, delivered every minute to critical areas of certain ailing hearts, is enough to protect them from heart mechanism failure. It is mechanism failure which strikes "a vast segment of our population."

Experiments showing that just a little blood will save these persons and the development of two operations to supply the vitally needed drops of blood per minute are reported by Drs. Claude S. Beck and Davis S. Leighninger of Western Reserve University School of Medicine, Cleveland.

A "small beginning" for prevention of degeneration of the arteries has been made in the experimental laboratory, the two doctors stated. In the meantime, some lives can be prolonged in spite of defects.

The physicians began their work in the revascularization approach to heart disease in 1932.

A follow-up study of 25 patients showed mortality rates were improved and four out of every five patients who survived had complete or marked reduction of pain. They also were better able to work after their operations.

The physicians explained that in occlusive disease (when arteries develop plugging that cuts off blood supply to heart areas), heart failure death is either mechanical or muscular.

In muscular failure, the blood supply shortage causes damage to the heart muscle. In mechanical failure, however, the heart would be capable of functioning but fails because impaired circulation to the conducting mechanism interrupts the coordinated heartbeat.

The operations provide the small quantity of blood which protects the coordinating mechanism and saves life.

In one operation, the heart is stimulated by an irritating agent such as powdered asbestos, and tissue and fat are grafted to the heart surface. In the other operation, a vein graft is connected to a channel leading into the heart and the channel is later pinched in to raise pressure.

The techniques are actually ways of helping the heart in its own attempts at defense against occlusive disease. Diseased hearts ordinarily try to develop additional circulation themselves, but sometimes this development is slower than the progression of the disease. An operation performed before the disease reaches a crisis helps insure the auxiliary blood supply.

For this reason, the operations can be done only on those patients whose vessels have become plugged, and defenses are developing, but in whom an occlusion crisis has not occurred.

Best-suited for the operations are lean persons in their 40's or 50's who have had the disease for a year or so, have pain, but are still able to get around. Patients with heart failure from degenerated heart muscle are not acceptable for operation.

Science News Letter, December 4, 1954

ICHTHYOLOGY

African Fish Eat Only Fish Scales

➤ AN AFRICAN fish has exhibited a very odd diet. It eats only fish scales.

Unlike its American cousin, the sunfish, which will even nibble at white bread small boys often use for bait, this African species turns up its nose at earthworms, fish powder and insects in favor of plain fish scales from other living fish.

The eating habits of several Tankanyika Cichlids were observed and are reported in *Nature* (Nov. 13) by G. Marlier and N. Leleup of the Tanganyika Laboratory at the Institute for Scientific Research in Central Africa, Uvira, Belgian Congo.

The scientists state that the fish, when it succeeds in attacking another fish, pushes its mouth against the back of its victim and removes the scales. It is hoped that continued study of the fish will solve some of the mystery as to the origin and reasons for his peculiar diet.

Science News Letter, December 4, 1954

ICHTHYOLOGY

Tropical Knifefishes Give Off Electricity

➤ KNIFEFISHES INHABITING the fresh tropical waters of Central and South America, close relatives of the electric eel, have been found to emit low intensity electrical pulses when moving.

Unlike the eel, which emits single or short bursts of pulses of high intensity, the knifefish emits low intensity pulses continuously and with regularity.

The electricity-producing organ identified by Dr. C. W. Coates of the New York Zoological Society and Profs. M. Altamirano and H. Grundfest of the College of Physicians and Surgeons, Columbia University, is described in *Science* (Nov. 19).

Heretofore, it was thought that the electrical pulses originated in the muscles.

The scientists also found that the discharges are most likely centrally controlled from the brain. When at rest, the knifefish emits no detectable electrical activity. Although the significance of the pulses is unknown, it has been suggested that these discharges serve as the fish's radar, orienting it with regard to obstacles.

Science News Letter, December 4, 1954

F-101 VOODOO—Believed to be one of the world's most powerful fighter airplanes, the F-101 Voodoo was developed for the U. S. Air Force by McDonnell Aircraft Corporation. It is in the supersonic class and capable of carrying atomic weapons. It can be refueled in flight. The plane will be used by the Strategic Air Command.

MEDICINE

Non-Stomach Ulcers

➤ "HE HAS ulcers" has become such a common remark that it is surprising to find a good many are rather ignorant about ulcers.

For example, probably most people think of ulcers as always being in the stomach, but the majority occur instead in the first part of the small intestine. The medical name for this is the duodenum and the ulcers are called duodenal ulcers.

Some may think of an ulcer as something painful and dangerous, but may not have any idea what it looks like. An ulcer looks like "a clean-cut or pinched-out hole in the lining of the stomach or the duodenum," according to a description from the Illinois State Medical Society.

Just why ulcers occur is not known. Many theories have been explored, but the most accepted one points to some interference in the digestive process, the medical society reports.

The stomach secretes substances that help to digest food, and included among these substances are hydrochloric acid and pepsin.

Pepsin is involved with the digestion of a group of foodstuffs, of which meat is a principal item. It is believed that the acid and probably the pepsin, in some chemical process, cause the ulcer.

Since these two substances are normally present in the body, just why the ulcers occur in some persons and not in others is not known. Emotional and mental strain, anxiety and tension are all considered factors, but the exact underlying cause for the loss of the stomach's protection against digestion by its own juices is not known.

An ulcer may develop at almost any age from infancy to old age, but the greatest incidence of ulcers is between the ages of 20 and 50, and in men more than women. Most ulcers seem to occur and recur in the spring and fall, giving the victim little cause for complaint in the summer months.

Science News Letter, December 4, 1954

MEDICINE

Tuberculosis Resistance

➤ RESISTANCE TO tuberculosis may be related to the relative amounts of different hormones produced by the adrenal glands.

Studies in rabbits suggesting this were reported by Dr. Max B. Lurie of the University of Pennsylvania's Henry Phipps Institute, Philadelphia, at a meeting in New York of the committee on medical research of the American Trudeau Society. This is the medical section of the National Tuberculosis Association.

Excess of compound F, or hydrocortisone, is associated with reduced resistance by the rabbits to a human strain of TB germs given by inhalation. A reduction in the proportion of compound F and a corresponding increase of compound B, or corticosterone, is associated with increased resistance to the disease.

These studies were made in cooperation with scientists at Harvard Medical School, Boston, and the Worcester Foundation for Experimental Biology, Shrewsbury, Mass.

Earlier Dr. Lurie found that rabbits with native resistance to tuberculosis could destroy TB germs faster, as they got into the lungs, than susceptible rabbits, and that the resistant rabbits also acquired specific resistance to the germs faster than the susceptible ones.

Fixation of the germs at the portal of entry is of secondary importance, while the digestive capacity of the body's scavenger cells for the germs is of primary significance in the operation of native resistance, Dr. Lurie reported.

The germ-digesting property of the phagocytes, or scavenger cells, is under the influence of hormone balance.

Dr. Lurie and associates are continuing their studies of the relation of hormones to TB resistance, working on the effect of age factors, alloxan diabetes and thyroid gland function.

Science News Letter, December 4, 1954

OPERATIONS RESEARCH

Mental "Temperature" Explains Productivity

➤ A NEW concept of mental "temperature" may explain why some scientists are over 100 times more productive than others.

The theory was explained by Dr. William B. Shockley, director of the Weapons System Evaluation Group of the Department of Defense, at the meeting of the Operations Research Society of America in Washington.

He said that the differences in rates of scientific production are much larger than other variations among men. No runner can race a mile 100 times faster than another, and one man does not speak 100 times faster than another, he said.

The concept of mental "temperature," or capacity, likens the production of ideas to a chemical reaction. A small increase in temperature can speed the reaction considerably.

If a man's mental temperature is twice that of another, he is likely to be 100 times more productive.

Mental temperature may be related to the number of ideas a scientist can consider at one time, said Dr. Shockley. Small increases in this capacity may greatly increase his productivity.

A study of the relationship between salary and productivity, however, shows that to win a 10% raise, a research worker must increase his output between 30% and 50%.

The basis for the report was a statistical study of the production of scientists at Los Alamos Scientific Laboratory, the National Bureau of Standards and other laboratories.

Science News Letter, December 4, 1954

SCIENCE NEWS LETTER

VOL. 66 DECEMBER 4, 1954 NO. 23

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 7-2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 1 E. 54th St., New York 22, ELdorado 5-5666, and 435 N. Michigan Ave., Chicago 11, SUperior 7-6048.

PHYSICS

Radio Waves Accurate For Time Signals

➤ RADIO WAVES can be used as a standard of time accurate to one part in 1,000,000,000, three scientists reveal in *Nature* (Nov. 13).

This is 200 times more accurate than the presently used system, which also depends on radio waves, but those that are in the high frequency range.

The more accurate method, so far only experimental, uses a 60-kilocycle wave. This is reported by Dr. J. A. Pierce of Harvard University, Cambridge, Mass., Dr. H. T. Mitchell of the Radio Experimental and Development Laboratory, Post Office Engineering Department, London, and Dr. L. Essen of the National Physical Laboratory, Middlesex.

The 60-kilocycle wave, although broadcast with only 10 kilowatts of power from Rugby, was picked up by scientists at Harvard University.

Results of their research, the three scientists state, "are clearly of significance in problems of frequency control, international frequency and time standardization and navigational aids based on phase comparison," and are probably of interest in a much wider field.

Science News Letter, December 4, 1954

ICHTHYOLOGY

Second Fish of Its Kind In 100 Years, Found

➤ A REDISCOVERED hybrid fish was reported in the Columbia River, almost 100 years after the first and only other of its kind was found.

A soft-finned, fresh water fish belonging to the family that includes carps, shiners, chubs and goldfishes, the hybrid has no common name. It has been identified as a cross between a Columbia River chub, *Mylocheilus caurinum*, and a red-sided bream, *Richardsonius balteatus balteatus*.

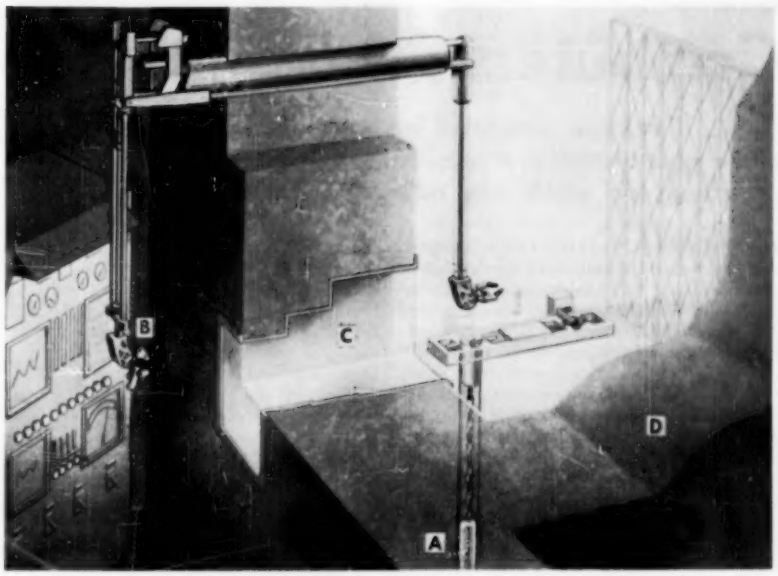
The rediscovered hybrid is described in *Copeia* (Oct. 29) by Dr. George F. Weisel, professor of zoology at Montana State University, who stated that the specimen was caught in the summer of 1952 in the upper reaches of the Columbia River.

The first hybrid was found by a naturalist at Fort Vancouver on the Columbia River during the explorations and surveys made in 1853 to 1855 to find the most practicable route for a railroad to the Pacific.

Dr. Weisel reported that this fish was originally named *Cheonda cooperi*, but upon later examination by scientists it was identified as a unique hybrid. The 100-year-old fish is now deposited in the U. S. National Museum in Washington.

Science News Letter, December 4, 1954

The *apple*, now growing over a larger area of the world than any other fruit, is related to the rose, blackberry and strawberry.



RADIATION LABORATORY "CAVE"—This artist's sketch shows how the "hot" laboratory of the Esso Research Center will look when completed. "A" pinpoints location of radioactive cobalt "pipe" at bottom of storage well. "B" spots one of the two arms of the mechanical hands that scientists will operate from this area. The lead-glass window, "C", is over three feet thick, while the concrete walls such as at "D" are more than four feet thick.

PHYSICAL CHEMISTRY

Make New Polymers

➤ BY BORROWING chemical energy from radioactive cobalt, one of the most powerful isotopes known to man, polymers may be built up that will revolutionize the way in which petroleum is split for various industrial uses.

Gasoline, once the most important petroleum product, now competes for usefulness with petrochemicals of many kinds.

New petrochemicals were forecast when the Standard Oil Development Company, announcing its new radiation laboratory, stated that polymerization studies would be carried on in the radioactive "cave" of the new building.

Cobalt that has been made radioactive in the reactor of the Brookhaven National Laboratory, Upton, N. Y., will be placed in a pit at the bottom of this cave. It will give off rays up to 4,000 times as powerful as those from a gram of radium.

One gram of radium was, about 30 years ago, the world's total supply of purified and concentrated radioactive material.

Such materials as synthetic rubber, plastics and lubricants are expected to result from action of these radioactive rays on petroleum chemicals. Energy supplied to these chemicals makes them combine into large molecules of the type now being used in the materials for modern living.

No danger from using this strong source of radiation is anticipated, officials of the Standard Oil Development Company state, because exceptional precautions have been taken to shield personnel, to handle the radiation source by remote control, and to sink the radioactive material below heavy lead shielding when it is not in use.

Science News Letter, December 4, 1954

GENERAL SCIENCE

Dr. Linus Pauling Given Passport

➤ DR. LINUS Pauling, California Institute of Technology chemist, will be able to go to Stockholm to receive the 1954 Nobel Prize in chemistry. (See SNL, Nov. 13, p. 307.)

The Department of State validated a passport for him and his wife to travel around the world, visiting India and Japan after the presentation of the Nobel Prize in chemistry on Dec. 10.

Dr. and Mrs. Pauling will fly direct to Stockholm from Los Angeles via the polar route. The visits to India and Japan are in response to invitations from fellow scientists, repeated in the case of India because Dr. Pauling could not get Department of State permission to make a trip there last year.

Science News Letter, December 4, 1954

METEOROLOGY

Computers Predict Rain

Electronic computer has been used experimentally to make quantitative prediction of precipitation. Temperatures, pressures and winds now being forecast by machine.

➤ ELECTRONIC COMPUTERS can predict in advance of storms how much rain or snow will fall, Dr. Joseph Smagorinsky of the U. S. Weather Bureau in Washington disclosed at the American Meteorological Society meeting in Miami Beach, Fla.

This is the first time precipitation forecasts have been made quantitatively and the first time they have been made by computers, Dr. Smagorinsky said. Previously, weathermen's predictions of amounts of rain or snow have been pretty much educated guesses.

Forecasting precipitation by computer has worked well so far only for large areas, such as two or three counties. The formulas are not yet accurate enough to allow predictions pinpointing snow or rainfall for a particular section of a city.

Also, Dr. Smagorinsky said, it takes about twice as much time on the computer to forecast precipitation as it does to forecast temperatures, pressures and winds, which is now being done experimentally.

Daily predictions of temperatures, wind flow and pressure patterns by computer will be made next year by the Joint Numerical Weather Prediction Unit, operated by the Weather Bureau, the Navy and the Air Force. Delivery of the computer is expected about February, and the unit's members are now planning programs for it.

Dr. George O. Collins Jr., also of the Weather Bureau and a member of the numerical prediction unit, worked with Dr. Smagorinsky on the precipitation prediction problem. They expect to improve the accuracy of their forecasts after gaining more experience with the machine.

Their predictions were made for rain from the great storms of Nov. 5, 1950, and Nov. 24, 1953, using only data available before the event. The forecast made by the computer according to their formulas and the actual amount of rain recorded compared "closely," Dr. Smagorinsky said.

In making their predictions, the two scientists neglected moisture sources, evaporation and possible lack of condensation nuclei. They did take into account humidity readings and large geographical features.

Although now precipitation predictions are run on the computer as a separate step, Dr. Smagorinsky expects to be able to work out formulas for telling the machine how to do such forecasts at the same time that temperatures, winds and pressures are predicted.

For precipitation forecasts, the computer predicts the vertical velocity distribution every three hours. Weathermen find predicting precipitation considerably more difficult than temperatures or winds.

Science News Letter, December 4, 1954

OPERATIONS RESEARCH

Bet the Horses and Win

➤ A SCIENTIFIC way to bet the horses and win—"in the long run"—was disclosed at the meeting of the Operations Research Society of America in Washington.

Based on data in the daily racing forms, the method, developed by Herbert Ruderfer of the Celanese Corporation of America, can help you determine the probability that a nag will come through. He has charts that tell how much to bet and where to put your money so that you have the best chance of winning.

One large factor in determining the worth of a horse is missing in racing forms, thus decreasing the accuracy of the system, he said. This is the large variation in the speed of tracks all over the country.

Some tracks in New York, for instance are as much as 2.5 seconds slower than the fastest in the country, and even this variation changes from day to day. He suggested that daily information on the "drag" of each track should be published.

The regular racing fan who "figures the odds" in his mind, mostly by "intuition," could improve his take by applying the new system, which substitutes mathematics for hunches.

Mr. Ruderfer repeated the old saw that "there is no such thing as a sure thing," but a person who applies his organized betting procedure is almost sure to come out ahead in the long run.

Once a fan determines the probability of winning for each horse, he can tell by consulting the charts which horse is the best bet.

Here are some rules Mr. Ruderfer has formulated:

1. When you bet a long shot, and it is truly a long shot, bet small.

2. Sometimes it is advisable to bet on more than one horse in a race.

Mr. Ruderfer, a betting man himself, always brings a little black book of charts with him to the track.

And he is ahead, he says—so far.

Science News Letter, December 4, 1954

• RADIO

Saturday, Dec. 11, 1954, 5:00-5:15 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Conrado F. Asenjo, head of the Department of Biochemistry and Nutrition at the University of Puerto Rico's School of Medicine, will discuss "New Source of Vitamin C."

METEOROLOGY

Weather Aids Forecasts Of Citrus Insect Attacks

➤ HOW THE weather during one month enables Florida entomologists to forecast citrus insect attacks four months away was described by Dr. Robert M. Pratt, entomologist and pathologist of the University of Florida, at the meeting of the American Meteorological Society in Miami Beach, Fla.

He reported that weather conditions affect the life span and mortality of the insects directly, and also indirectly, through control of the natural enemies of the injurious pests.

Coupling what is known of the annual population cycles of a given insect with how the weather affects future generations has made possible weekly forecasts of what the citrus growers can expect.

During the last fiscal year, the forecasts based on this method of prediction were 83% correct, Dr. Pratt stated.

A cold December, for example, will allow the insect experts to predict an abundance of the six-spotted mite during the succeeding months through May, because it has been found that the temperature in December is directly related to the six-spotted mite population for the next four months.

Similarly, rainfall is a factor in predicting whether heavy or light infestations are to be faced by citrus groves from the citrus red mite. The more rainfall, the fewer are the mites, and the less rainfall, the more mites.

Science News Letter, December 4, 1954

TECHNOLOGY

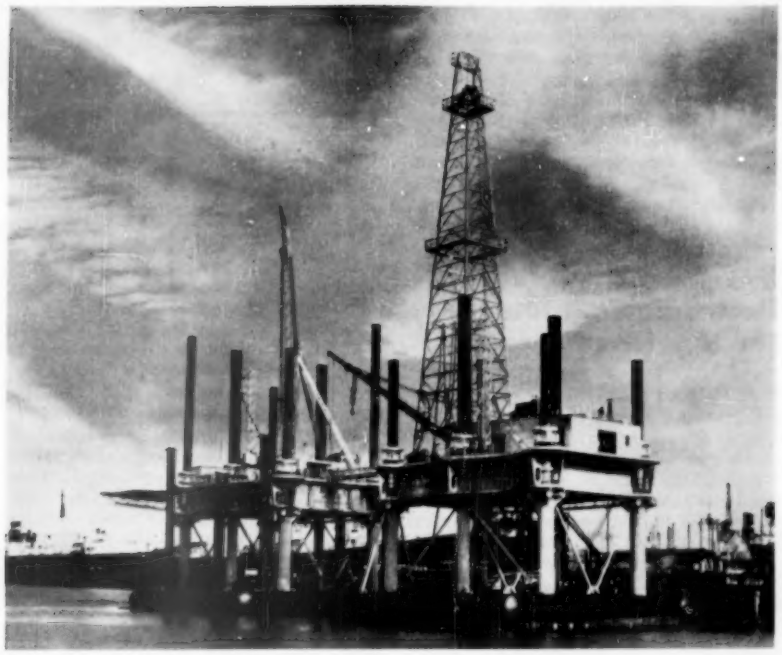
Rubber Hose Used To Move Ores

➤ A HOSE that outwears steel pipe in transporting ten-pound chunks of coal or ore has been designed by B. F. Goodrich engineers. The tubing is lined with abrasion-resisting rubber.

Lumps of ore up to eight inches long are flushed through the hose by a high-pressure stream of water from the mine to the factory and from process to process.

The hose has proved especially useful as a substitute for pipe bends. Abrasive particles cause severe wear at turns in conventional piping systems. Unlike the pipe, the rubber hose can be rotated to distribute the wear at these points.

Science News Letter, December 4, 1954



OFFSHORE DRILLING UNIT—Designed to operate in waters as deep as 100 feet, this mobile driller is now operating off the Texas coast. The drilling platform is on the right, with derrick, and the service platform, with a helicopter port, on the left. The two are towed separately to desired location where hydraulic jacks are used to force corner piles four feet in diameter into the ocean floor. The lower hulls are then filled with water and sunk to help the piling support the upper hulls. The two platforms are then connected by a narrow steel catwalk.

CYTOLOGY

Cigarette-Cancer Test

► A SETUP for what might be the crucial test in the cigarette-lung cancer controversy has been created at the Sloan-Kettering Institute of the Memorial Center for Cancer and Allied Diseases in New York.

The setup comes as close to being a human guinea pig for such tests as is ever likely to be possible. It consists of normal human lung tissue growing in laboratory animals, specifically rats and hamsters.

Chemicals from cigarette smoke, which cause cancer in mouse skin, will be tested on this new kind of human guinea pig, to see whether they cause cancer of human lungs.

The human lungs came from human embryos that had to be removed from the maternal bodies for other reasons. Growth of the tissue in the rats and hamsters in large enough amounts for tests was achieved by pre-treating the rats with X-rays and by treating both rats and hamsters with cortisone, adrenal gland hormone first famous for relief of arthritis.

Human lung cancers as well as normal human lung tissue can now be grown in laboratory animals. While the normal human lung tissue is being used to test for possible cancer-causing chemicals in cigarette smoke, the human lung cancer tissue in laboratory animals will be used to test possible lung cancer-stopping chemicals.

One such chemical already has been found, and two others have "very temporarily" restrained cancer of the lung in human patients. These two chemicals are nitrogen mustard and the related TEM, or triethylene melamine.

The cancer-stopping ability of these chemicals might be increased by X-rays and this is now under trial at Memorial.

Nine out of ten heavy smokers do not get lung cancer, Memorial's Board of Trustees points out in their report on the institution's research attack on the problem. But four out of five lung cancers are "estimated" to be due to smoking.

What makes the nine resistant? Memorial scientists suspect hormones and are now testing this point.

Science News Letter, December 4, 1954

One heavy bomber has as much *power* as nine locomotives.

AERONAUTICS

Russian Air Research Almost Equal to U. S.

► RUSSIA'S AIR research program has advanced "at a rate far in excess of all normal expectations" and today is almost equal to that of the Western powers.

"There is sufficient reason to assume that any aerotechnological gap which once existed between the U.S.S.R. and the Western powers is all but closed," Jack W. Rizika, currently working with the Massachusetts Institute of Technology department of mechanical engineering and the aircraft gas turbine division of the General Electric Company, reports in the Institute's *Technology Review* (Nov.).

The scientist attributes this sudden "catching up" in such fields as radar, turbojet engines and guided missiles to the fact that the Russians fell heir to the majority of German aeronautical experts, factories and working models at the end of World War II.

At that time, in his opinion, the Germans were far ahead of the rest of the world in air research and development.

The scientist states that the German Air Ministry and the U. S. Strategic Bombing Survey reported that over two-thirds of the German aircraft production facilities, at the end of the war, were located in the Soviet occupied territories and this represented production of 25,000 airplanes in 1944.

These same plants included 63% of the total German facilities for producing fighters and pursuit planes, 91% of the medium bomber production, almost 98% of the heavy bomber production and about 73% of production of all other types of aircraft.

Together with the German developments, designs and research data taken from their own occupied territory, the Russians received additional German data from verbatim interrogations made by the Western Allies of German scientists, and handed over to the Russians under the exchange of information agreements in force at the end of the war.

Mr. Rizika also reports that the Russians added to the over-all German data with information gathered from the systematic analysis of American equipment either given to Russia or forced down in Russian territory during the war, most notably the B-29.

"It cannot be denied that, technically, great advancements were made by the Soviets during the war years. However, though the advancements were great, the Soviet Union finished the war about five years behind the Americans, British and Germans; the Soviets had not developed radar, radio-controlled flying bombs, nor jet-propelled airplanes," the Massachusetts expert states.

However, he says, today's Russian aircraft compare favorably with modern American and British airplanes.

Science News Letter, December 4, 1954

ENTOMOLOGY

Successful 1954 War on Crickets, Grasshoppers

➤ THE 1954 war against grasshoppers and Mormon crickets carried out by the Federal and State governments in nine Western states saved an estimated $3,486,000 of livestock forage alone.

Claiming success in their annual battle against these two pests, U. S. Department of Agriculture entomologists stated that 788,000 acres of rangeland were treated for the 'hoppers, and 122,000 for the Mormon crickets.

The control program returned nine dollars for every dollar spent to combat the grasshoppers, and an estimated six dollars for every dollar spent to fight the crickets. Total savings of all the crops from these pests, which are normally estimated by each state, are not yet available.

However, estimates from the nine western states of Colorado, Idaho, New Mexico, Oregon, Texas, Utah, Wyoming, Montana and Nevada, covering the years 1935 through 1953 show that grasshopper control alone has saved American agriculture more than $1,000,000,000.

The control program was carried out by conventional spray and bait-spreading airplanes with many of the new organic insecticides. Thousands of acres of untreated crops and adjoining range were thus protected from invading grasshoppers and crickets.

Science News Letter, December 4, 1954

PHYSICS

Unusual Material Made As Single Crystal

See Front Cover

➤ BARIUM TITANATE, a material with an exceptional electrical behavior, is being extensively studied in laboratories around the country.

Reason for the heavy interest in this unusual material is that the sensitive atoms of barium titanate show a remarkably quick response to the slightest changes in pressure, temperature or electrical field. Even light, shining on a crystal of it, will cause the atoms to rearrange themselves.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows an "interesting and typical pattern of ferroelectric domains" of a single barium titanate crystal, Dr. Walter J. Merz of Bell Telephone Laboratories, New York, has stated.

Similar to the ferromagnetic domains of iron, he explained, the electric polarization of the material can be along one of six directions.

The sharp 45 degree lines on the photograph are 90 degree walls, that is, boundaries between domains polarized at 90 degrees to each other.

The 180 degree walls, which are boundaries between antiparallel polarized domains, cannot be seen very easily. However, by applying an external electric field or stress to the crystal, the optical extinction position for parallel and antiparallel domains can be changed in opposite directions, thus making the two types of domains distinguishable in polarized light.

The dark and bright horizontal and vertical bands on the photograph are the antiparallel domains, and the 180 degree walls themselves cannot be seen.

Science News Letter, December 4, 1954

METEOROLOGY

Electronic Computers For Hurricane Forecasts

➤ BETTER PREDICTION of hurricane paths should result from using electronic computers to keep track of what is going on high in the atmosphere over the middle latitudes, Dr. Charles L. Jordan of the U. S. Air Force's Air Weather Service in Washington told the American Meteorological Society meeting in Miami Beach, Fla.

The hurricane itself may be too small to be tracked directly by the computer, Dr. Jordan said. Tremendous as the energies involved are, the tropical storms are nevertheless relatively small-scale atmospheric disturbances.

The presently used system, still experimental, is to put into the computing machine weather data for points 300 miles apart. Winds of hurricane force usually swirl only within 200 miles or less of the "eye."

The wind pattern high in the atmosphere seems to steer the hurricane. Computing machines should aid in understanding large-scale motions of the atmosphere.

Science News Letter, December 4, 1954

BIOCHEMISTRY

Chemical Cuts Down Growth of 'Flu Virus

➤ A CHEMICAL that cuts down markedly the growth of mumps and influenza virus in living tissue is described in *Science* (Nov. 19).

Known as TRB for short, the chemical was tailormade because a very similar compound, called DRB, had previously been found to inhibit growth of 'flu and mumps virus.

Dr. Igor Tamm of the Hospital of the Rockefeller Institute for Medical Research reports the tests with the two chemicals.

Chemically, TRB is 4,5,6-trichloro-l-beta-D-ribofuranosyl-benzimidazole.

"It should be emphasized," Dr. Tamm stated, "that TRB is 760 times more active" than the control compound with which it was compared.

When the chemical was injected into eggs previously inoculated with mumps virus, it stopped further growth of the mumps virus almost completely. There was no other effect apparent in the egg tissue.

Science News Letter, December 4, 1954

IN SCIEN

TECHNOLOGY

Electronic Device Spots And Discards Bad Eggs

➤ AN ELECTRONIC device has been developed which spots the early stages of green rot in eggs and throws away the infected ones.

Green rot, which causes more spoilage in the egg industry than any other bacterial infection, gets its name because the albumen of infected eggs fluoresces green under ultraviolet or black light.

U. S. Department of Agriculture scientists used this color fact in the development of the machine. It automatically detects the disease by passing ultraviolet rays through the egg, and measuring the green color wavelength. Spoiled eggs are rejected as they come off the machine.

Up to the present, badly rotted eggs were visible to the human eye by ultraviolet candling, but low levels of infected eggs went undetected. These often spoiled in cold storage, or on the way from the farm to the store.

The machine is designed for use in large-scale operations, such as those conducted by packers, wholesalers and chain grocers.

Science News Letter, December 4, 1954

ENTOMOLOGY

Mosquitoes Down Under Found to Be Fussy Eaters

➤ AUSTRALIAN MOSQUITOES are fussy about whose blood they take and where they do their feeding.

Some mosquitoes prefer rabbits to man, horses to rabbits and chickens to horses for their blood meals. Some mosquitoes like to feed under shelters, while others dine out-of-doors.

These facts were learned from the results of over 1,400 tests on the stomach contents of engorged mosquitoes to determine the source of their blood meals. The tests were made by D. J. Lee, K. J. Clinton and A. K. O'Gower of the School of Public Health and Tropical Medicine at the University of Sydney, Australia.

The Australian scientists also found that two species of mosquitoes that attack both poultry and man are likely suspects for the transmission to man of Murray Valley encephalitis.

One of these, together with two other species that attack rabbits, have an important role in myxomatosis transmission.

Anopheles annulipes, on the other hand, because it attacks man only casually, is unlikely to assume any importance as a vector of malaria in Australia, the study revealed.

Science News Letter, December 4, 1954

CE FIELDS

ENGINEERING

"No Real Advantage" In Warming Car Motor

➤ THERE IS "no real advantage" in warming up your automobile engine on cold winter mornings, P. N. Ku of the National Bureau of Standards told SCIENCE SERVICE.

Although no one can tell for sure, most scientists who work with engines believe that little, if any damage is done by driving right off as soon as the car motor is turning over satisfactorily.

Waiting to drive off until the temperature gauge reaches a certain reading or normal operating level is not necessary, Mr. Ku said.

This is contrary to what most people are told about their car motors. They think that oil will not flow right away if a load is put on the engine too soon. They believe that some or all bearings might thus be starved for oil and that it is best to wait a few minutes before driving the automobile.

However, as long as the car has lubricating oil that is being forced through the engine, which it should be when the motor is turning over, delaying driving does not make any real difference.

Mr. Ku is acting chief of the engines and lubrication section of the National Bureau of Standards.

"The problem of driving right away when the car engine is cold," he said, "is not cut and dried. The best way to phrase advice is to say that there is no real advantage in warming up the motor."

Science News Letter, December 4, 1954

VETERINARY MEDICINE

Hog Farmers Warned This Is Flu Season

➤ FARMERS HAVE been warned that this is the season for one of America's most costly swine diseases, influenza.

Swine raisers should be alert for such symptoms as loss of appetite, severe coughing, labored breathing and a watery discharge from the eyes, the American Veterinary Medical Association in Chicago said.

Although the mortality rate from influenza itself is low, secondary infections and a retarding of the weight gain, as well as a loss of weight, are possible dangers to a herd.

The association reported that "influenza can be confused with several other serious hog diseases, so a diagnosis is of prime importance when symptoms resembling 'flu appear."

It recommended measures to counteract an influenza epidemic in swine. Farmers should keep hog houses clean and well ventilated, free of drafts, and with plenty of good dry bedding.

Infected swine can transmit the influenza virus to humans who come into close contact with the animals, Dr. L. O. Mott, chief of the virus and rickettsial animal and parasite research branch at the U. S. Department of Agriculture's Experiment Station in Beltsville, Md., said.

Experiments conducted in the laboratory to show transmission from hogs to humans have not been successful, the scientist stated, but transmission has occurred often in natural surroundings.

Science News Letter, December 4, 1954

ICHTHYOLOGY

Among Some Fishes, Female Is Voiceless

➤ COMMUNICATION IS just as important to a fish as it is to a man.

Dr. C. M. Breder of the department of fishes and aquatic biology, American Museum of Natural History, reports this in *Research Reviews* (Nov.), publication of the U. S. Navy's Office of Naval Research.

Not all fish have voices, Dr. Breder says, but male croakers are among those that do. In the breeding season, they join in great choruses as do frogs. A female croaker is voiceless, however—she can listen to her suitor but cannot talk back.

Although fish do not have external ears, they can hear. Outer ears are not necessary in the water, because the greater density of the water in contact with the head of the fish carries sound to the inner ear. In fact, fish have organs of hearing completely lacking in land animals. These are a series of pores or canals just under the skin.

Dr. Breder suggests that this system, known to scientists as the "lateral line," is used by the fish as a sort of "sonar" or "micro-echo-ranging" to keep the fish from colliding with each other or other obstacles as they dart about under very crowded conditions.

Fish that swim along together in perfect formation in schools use vision to keep the group in line, Dr. Breder indicates. Although they can maintain schools on rather dark nights, they break up in absolute darkness, or when the fish are blinded, experiments have shown.

There is no leader for a fish school, Dr. Breder states. In fact, it sometimes happens that the first fish in a school are turned by some influence so that they catch sight of the trailing members of the same school. Then they follow around in a circular path and continue to go around and around in a manner that is silly even to the fish until something happens to break up the "mill."

Fish have taste buds as do men, Dr. Breder reports, but in fish these are not confined to the mouth. They are distributed over the surface of the head and sometimes as far back as the tail fin.

Science News Letter, December 4, 1954

TECHNOLOGY

"Airdock" Unloads Plane In Only Four Minutes

➤ AN AIRLINER can be emptied of its passengers, baggage, mail, express and freight loads in only four minutes in a newly developed "Airdock." The process ordinarily takes about 20 minutes.

Instead of being unloaded on the airfield by a fleet of trucks, carts and tractors, the plane is towed tail first into a special hangar where ramps, bridges, conveyor belts and hydraulic lifts do the work.

The revolutionary system was tried out in a full-scale mock-up experiment by United Airlines in Denver. A DC-6B Mainliner carrying a test load was used in the operation.

Passengers filed out on a bridge at the same level as the cabin door. Meanwhile, workers unloaded baggage and freight onto a 140-foot-long conveyor belt that moved swiftly to a large circular revolving table. As the passengers walked down from the overhead bridge, their baggage was sorted for claiming.

Loading for the next flight is also expected to be speeded up by this system.

The Airdock would eliminate 70% of the mobile equipment now used to service airplanes. Passengers would be under the shelter of the hangar to and from the cabin door.

The terminal is designed to handle DC-6's, DC-6B's, DC-7's and Mainliner Convairs.

Science News Letter, December 4, 1954

MEDICINE

Skin Grafts From Corpses Save Burn Patients

➤ SEVERELY BURNED persons can now be saved from death by skin grafts from a corpse.

The new technique, which has been tested on only a few patients, can carry a person through the emergency period when he would not survive grafting from his own sound skin.

Two St. Louis doctors report the procedure in the *Journal of the American Medical Association* (Nov. 20).

Drs. James Barrett Brown and Minot P. Fryer of the Washington University School of Medicine said that their success so far with the technique has led them to make their report without waiting for an impressive array of cases.

Many lives might be saved by such prompt reporting, they say.

These postmortem grafts will "take," even if only held in place by a wrapping of fine greased gauze, closing the wounds and protecting them from infection until the critical period is past.

"The procedure could be developed on a national basis, possibly saving many lives in the event of widespread disaster," the doctors said.

Science News Letter, December 4, 1954

METEOROLOGY

Jet Stream Steers Weather

Bad weather often spills from the nose of the jet stream, fast-flowing river of air high in our atmosphere that gives added speed to west-to-east plane flights.

By ANN EWING

▶ WINTER STORMS ride on the jet stream's nose.

The jet stream is an invisible, 200-mile-per-hour current of air found streaking 10,000 to 40,000 feet above the earth's surface.

Often the stream itself completely circles the Northern Hemisphere. It takes on a wave-like pattern, the distance between crests covering thousands of miles.

High-flying airplanes get lifts on these west-to-east currents that cut hours from their arrival times when they are headed eastward.

The speediest stream yet found was reliably clocked at 275 miles per hour over a 30-mile distance. Scientists suspect that winds slightly over 300 miles an hour are possible.

Often associated with these swift-flowing rivers of air is clear air turbulence that tosses airplanes around without warning. Such unseen danger areas are becoming more and more important as man flies at the higher and higher altitudes where today's jets operate more efficiently.

Only since the end of the war have scientists been making an intensive study of these strange upper air currents so closely associated with the kind of weather you and I experience.

Some scientists believe the jet stream affects ground weather by governing air flow patterns in the lower atmosphere.

The jet stream's existence was first uncovered when World War II pilots returned from bombing flights over Japan with strange tales that meteorologists at first found hard to believe.

Their planes, the pilots said, would often have a ground speed near zero approaching the target, a ground speed of about twice indicated air speed returning from the bombing run.

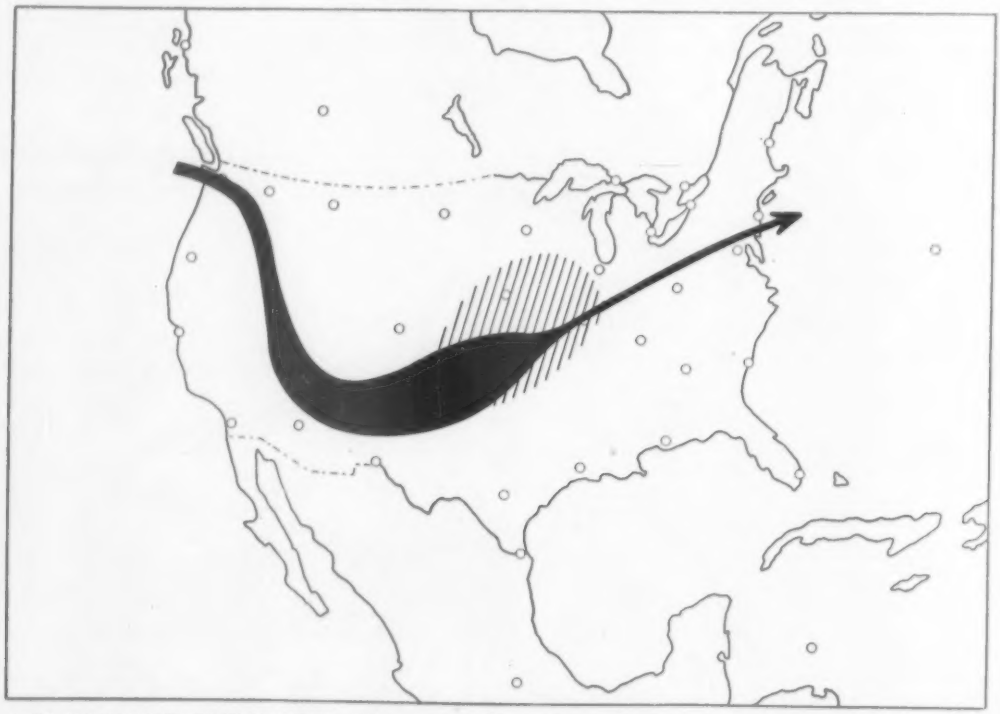
Now weathermen know that these pilots were bucking the jet stream when they were headed toward Japan. And now meteorologists for airlines, in so far as possible, route westbound high-level flights so as to avoid such strong head winds.

Usually, however, dispatchers from the airlines do not know exactly where the jet stream is. Its position can change rapidly from day to day.

To learn more about what causes the jet stream, why it takes the form it does and how to predict where it is going are among the big problems now facing meteorologists.

Answers to such questions would not only speed up high altitude flights, they would also assure more accurate predictions of tomorrow's weather as well as more accurate forecasts over longer periods.

Although there is a strong tie-in between jet streams and storms and rainfall on the earth's surface, many of the exact relationships are still to be established.



JET STREAM'S SILHOUETTE—Not a wild beast descending upon an unhappy country but a scientist's picture of the jet stream, this drawing shows how bad weather sits on the nose of this swift air current. The blacked-in area marks high-velocity concentration at the level of strongest wind, roughly 30,000 feet. Air in the jet shoots out forward through the nose and later loses its high speed.

However, Dr. Herbert Riehl, a University of Chicago meteorologist and specialist in jet stream studies, told SCIENCE SERVICE, "I have not yet seen a great winter storm formed in the middle latitudes without the jet stream as a starting mechanism."

The jet stream, he explains, can be likened to water under pressure in a hose. As water shoots out from the hose nozzle when it is turned on, so do high winds shoot out from the nose of the jet stream.

Although winds may be over 200 miles per hour in the jet, the nose will travel eastward at rates averaging 20 to 30 miles per hour, which is about the speed storms travel on the surface, so that the air in the jet shoots out through the nose and later loses its high speed.

Meteorologists do not yet know what causes the jet stream. They hope that extensive upper air soundings, both by radiosonde balloons and by aircraft, will solve this problem.

First Airplane Survey

The first wide-scale airplane survey of the jet stream was made under the direction of Capt. F. A. Berry, the naval officer who supervised Project AROWA, which stands for Applied Research Operational Weather Analysis, a study supported by the Navy's Bureau of Aeronautics. In Project Jet Stream, Air Force scientists, with different kinds of aircraft, are now coordinating their efforts with the Navy study.

From these and previous flights, scientists have learned that a thin stream shoots forward from the jet stream's nose, and that this stream is usually 200 to 300 miles wide.

They have also found that the jet stream is usually centered at about 30,000 feet, that its average speed is 200 miles an hour, and that 50% of the strongest winds are found within 50 miles on either side of the jet stream's center.

A miniature picture of how jet streams form and change shape is being made, in the laboratory, under controlled conditions, by Dr. Dave Fultz, University of Chicago meteorologist, and by other scientists using similar methods.

They rotate water colored with dyes in a pan heated around the edges and cooled at the center. Aluminum powder sprinkled on top of the water shows the jet streams, with their patterns changing as the rotation and heating rates are varied.

Meteorologists are also following with great interest studies being made of the Gulf Stream, for they have discovered that there are many similarities between the fast-flowing rivers of air in the upper atmosphere and the major ocean currents.

As the jet stream does, so the Gulf Stream remains concentrated in a relatively narrow band over rather long distances. It also meanders much as the jet stream. Further, the flow rate of the Gulf Stream drops off very rapidly on either side of the fastest part of the current.

Upper atmosphere readings will help to solve the jet stream riddle, but such meas-

Continued on p. 364

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

BIBLIOGRAPHY OF MATERIAL ON ANIMAL EXPERIMENTATION — *Illinois Society for Medical Research* and the *National Society for Medical Research*, ISMR Bulletin No. 6, 8 p.; paper, free upon request to publisher, 951 E. 58th St., Chicago 37, Ill. A selective bibliography including material from 1914 to August 15, 1954.

THE HEALTH OF REGIONVILLE: What the People Thought and Did About It — Earl Lomon Koos—*Columbia University Press*, 177 p., illus., $3.25. This book is a study of popular attitudes toward sickness based on a survey made in a rural community of New York State.

JIVARO: Among the Headshrinkers of the Amazon—Bertrand Flornoy, with foreword by Brian Fawcett — *Library Publishers*, 224 p., illus., $3.95. Telling of an expedition into the jungles of the Amazon to the Jivaro tribe and describing their techniques of human head-shrinking, a process heretofore unexplained.

MODERN CHEMICAL DISCOVERIES — Richard Clements—*Dutton*, 290 p., illus., $5.00. The author, a British science writer, has endeavored to bring together in one volume all the most important chemical discoveries of the past 50 years.

RIGS AND RIGGING OF YACHTS—D. Phillips-Birt—*Adlard Coles (John de Graff)*, 207 p., illus., $8.00. For yachtsmen, especially those planning a new rig.

SAILING AERODYNAMICS — John Morwood — *Philosophical Library*, 124 p., illus., $7.50. Presenting the theory of sailing for the yachtsman.

SOIL—G. V. Jacks—*Philosophical Library*, 221 p., illus., $5.00. To give farmers and students of agriculture an understanding of soil management.

TABLES OF INTEGRAL TRANSFORMS: Vol. II—Based, in part, on notes left by Harry Bateman and compiled by the Staff of the Bateman Manuscript Project — *McGraw-Hill*, 451 p., $8.00. Containing tables of further integral transforms and integrals of higher transcendental functions.

THE VITAMINS: Chemistry, Physiology, Pathology, Vol. III—W. H. Sebrell Jr. and Robert S. Harris, Eds. — *Academic*, 665 p., illus., $15.00. The last book in a three volume reference work, containing the vitamins from p-aminobenzoic acid to the tocopherols, as well as new and unidentified growth factors.

Science News Letter, December 4, 1954

Jet Stream

Continued from p. 363

urements must come from all parts of the world. At present, they are made extensively only over certain portions of the Northern Hemisphere.

During the International Geophysical Year, scheduled for 1957-1958, scientists around the world will coordinate their efforts to measure such things as daily changes in the earth's magnetic field, formation of "northern lights," and variations in shortwave radio propagation conditions.

For weathermen, among the most fascinating data to be taken will be the upper air measurements.

The first suggestion of the existence of a narrow, high-velocity region in the upper atmosphere was made in 1933 by the late Prof. V. Bjerknes and his associates.

Their suggestion went unnoticed until 1944, when Dr. H. C. Willett of Massachusetts Institute of Technology published diagrams suggesting a "localized high velocity stream in the upper westerlies."

In 1946, three University of Chicago meteorologists, Dr. Carl-Gustaf Rossby, a Swedish-American meteorologist, Dr. Eric Palmen and Dr. Riehl, made a full-scale theoretical attack on the problem.

At that time, Dr. Rossby suggested that the pattern of flow high above the middle latitudes suggests the presence of "a broad stream meandering eastward around the hemisphere in wavelike patterns. The kinetic energy of this stream is concentrated in a narrow band of high wind speed embedded in a relatively quiescent surrounding atmosphere."

Science News Letter, December 4, 1954

NEW!

EXCITING....

INSTRUCTIVE

"American Industry" EDUCATIONAL HOBBY KITS

for boys and girls from 8 to 18

From some of the greatest scientific and educational sources of the country comes this most practical idea for the training of young America. Here are the actual materials, equipment and instructions to enable these young minds to delve into the mysteries of electronics, optics, medicine, weather, gemology . . . to explore . . . experiment . . . build . . . and experience the thrill of success.

Endorsed by leading educators . . . produced with the cooperation of such top ranking companies as Radio Corporation of America, American Optical Company, Gemological Institute of America and others . . . these Hobby Kits offer remarkable advantages when used by the individual student or for classroom instruction.

No. 71940 Electronics Kit enables one to conduct dozens of experiments with radio, sound waves, electrons . . . to build a radio receiver, a transmitter and other units. **Complete set . . . $29.95**

No. 71945 Medical Kit contains instruments, supplies and instructions for emergency treatments, artificial respiration, treating a broken bone, etc. **Complete set . . . $19.95**

No. 71950 Rock Detective Kit contains tools, specimens, magnifying glass, identification charts, and other equipment for identifying rocks and minerals. **Complete set . . . $14.95**

No. 71955 Optical Kit contains materials and equipment for making such things as telescopes, microscopes, periscopes; bending light rays and other experiments with light. **Complete set . . . $22.50**

No. 71960 Weather Kit shows how to forecast weather. Includes a wide variety of materials and equipment plus a 48-page instruction book. **Complete set . . . $24.95**

Order today or write for our Bulletin No. 300 which contains complete details.

Gentlemen:

Please send the "American Industry" Educational Hobby Kit checked below.

Check ☐ Money Order ☐ enclosed.

- ☐ Electronics Kit No. 1 . . . . . $29.95
- ☐ Optical Kit No. 1 . . . . . 22.50
- ☐ Rock Detective Kit No. 1 . . . . . 14.95
- ☐ Weather Kit No. 1 . . . . . 24.95
- ☐ Medical Training Kit No. 1 . . . . . 19.95

Name_____

Street and Number_____

City_____

State_____

cenco

The most complete line of scientific instruments and laboratory supplies in the world

R.S.C.

CENTRAL SCIENTIFIC COMPANY

MAIN OFFICE — PLANT — CENCO INTERNATIONAL CIA.
1718-S IRVING PARK ROAD • CHICAGO 13, ILLINOIS

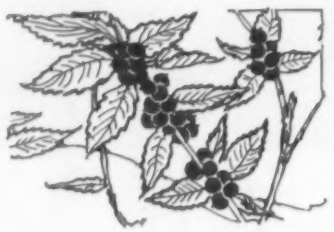
BRANCHES AND OFFICES — CHICAGO NEWARK BOSTON WASHINGTON DETROIT SAN FRANCISCO SANTA CLARA LOS ANGELES

CENTRAL SCIENTIFIC CO. OF CANADA, LTD. (and Hendry Division)
TORONTO MONTREAL VANCOUVER OTTAWA

REFINERY SUPPLY COMPANY — TULSA HOUSTON

BOTANY

NATURE RAMBLINGS



Winterberry

➤ CHRISTMAS IS already occupying a considerable place in the thoughts of children, and therefore, of necessity, in the activities of those who cater to the Christmas trade.

Even now the gatherers of holly and other Christmas greens are beginning to get their wares together, for in many cases these decorations must be shipped hundreds of miles, which takes a lot of time. Holly grows wild throughout the South, and along the Atlantic seaboard, except for the northern New England states. It can be cultivated inland.

We have become so used to thinking of holly as a mild-climate plant that it surprises us a little to learn of a native American holly that thrives perfectly well in the winter climate of the North, even in the upper Mississippi valley. We do not recognize it as a holly, because it does not have the hard, glossy, prickly leaves of our old familiar Yuletide friend, and because its softer foliage changes color and drops off in late autumn, in orthodox fall-leaf fashion.

But the winterberry is a true holly none the less, as will be recognized in a moment if one examines the round, red, glistening berries with which its slender stems are decked.

Botanical name for the holly family is Aquifoliaceae, and it includes some 300 species, distributed mostly in Central and South America. There are many kinds found in the U. S., however, and practically all of them belong to the genus Ilex, or true holly.

The winterberry is also known as the black alder, and is closely related to the smooth winterberry found in the swamps from Georgia to Pennsylvania. The winterberry does not reach tree size, as the Christmas holly does—it is never more than a tall and somewhat straggling bush.

In Virginia, it sometimes reaches a height of 25 feet, though its ordinary stature averages only about five or ten feet. It is found from Nova Scotia south to Florida, and westward as far as Missouri.

Like most of our other bright-berried shrubs, the winterberry has suffered considerably from the depredations of commercial collectors. Those interested in preserving the beauty of our native woodlands urge private individuals not only to refrain from taking winterberry, but also to refuse to buy it if it is offered on the market.

Science News Letter, December 4, 1954

Questions

ENTOMOLOGY—How do scientists learn what insects eat? p. 360.

□ □ □

ICHTHYOLOGY—How do fish schools keep in line? p. 361.

□ □ □

METEOROLOGY — What is the jet stream? p. 362.

□ □ □

OPERATIONS RESEARCH—What is meant by mental "temperature"? p. 356.

□ □ □

PHYSICAL CHEMISTRY—What materials are expected to result from radioactive bombardment of petroleum chemicals? p. 357.

□ □ □

PHYSICS—How has the accuracy of broadcasted time signals improved? p. 357.

□ □ □

Photographs: Cover, Walter J. Merz; p. 355, McDonnell Aircraft Corporation; p. 357, Standard Oil Development Co.; p. 359, Shell Oil Company; p. 362, Herbert Riehl; p. 368, Owens-Corning Fiberglas Corp.

(Advertisement)

A Shopping Tour Around the World For As Little As $1.83 a Month!

Armchair adventurers take magic carpet trips to the four corners of the earth on exciting shopping sprees without leaving home!

By Norma Bruce

EVERY month, thousands of adventure-loving Americans receive mysterious looking parcels, enclosed in exotic wrappings and plastered with foreign stamps. These packages come all the way from India, Africa, France, Egypt, Japan, England, Norway . . . or some out-of-the-way place you've never dreamed of!

The contents are always a complete surprise. One month, the postman may deliver a curious looking package containing an exquisite example of handwrought silver from the Far East . . . at another time, a wood-carving from sunny San Marino . . . or, a piece of Florentine sculpture from the birthplace of the Italian Renaissance . . . or again, a shimmering, pure silk *sari* from India, traditional article of clothing for the Hindu *Maharanees*. Each new gift brings these "armchair travelers"—members of the unique *Around-the-World Shoppers Club*—a greater thrill than the last. For whatever the surprise package may be . . . no matter from what far corner of the earth it comes . . . the gift is invariably beautiful . . . chosen with taste . . . a superb example of traditional craftsmanship!

Membership Costs About $2.00 Per Month

Members of the Around-the-World Shoppers Club receive these gifts for only $2.00 (and even less) per month. There are good reasons for this: the magic of the American dollar (foreign countries are eager for dollar credits) enables the Club to purchase fine foreign products at a fraction of their cost in this country. But that's not all. Even if an American tourist with his pockets stuffed with dollars were to tour the foreign countries in person, he still couldn't match the low Club prices. Huge membership means huge buying power. In many instances, the Club absorbs the *entire output* of a foreign artisan's studio over a long period of time. Tremendous savings are made by such large-scale buying. These savings are passed on to Club members.

Club Representatives Know "All the Angles"

In addition, the men who represent the Club abroad are trained, professional buyers. They are familiar with the market places of the world! They visit the great international fairs. They are acquainted with out-of-the-way places the average traveler never heard of In short, they know where to discover the hard-to-find, the unique, the outstanding buys.

These experts—to the further advantage of Club members—study the ups and downs of foreign markets. When, for example, the Greek drachma fell 50% in value, a Club representative flew to Athens. He visited the leading artisans of the country . . . finally uncovered a gift of rare beauty that could be sent to members for $2.00. If purchased a month earlier, this same article would have cost $4.00. If imported for sale in American shops, its price might have ranged from $5 to $10!

Gifts Are Intriguingly Different and Useful

Many American travelers return home from abroad with trunkloads of useless, high-priced "tourist trinkets." Not so these arm-chair travelers who belong to the Around-the-World Shoppers Club! They are receiving beautiful articles for the home, valuable decorative pieces, personal items they can use every day of their lives. And there is something for every member of the family—young and old. The Club is careful to select gifts that are *unusual and practical*—items that are seldom seen in American shops—articles that will give a lifetime of service and pleasure. Every gift represents the best of native art and craftsmanship. Many are made entirely by hand. Fine glassware, metalware, costume accessories, sculptured alabaster, laces, ceramics . . . these are but a few of the typical Club selections. Hundreds of unsolicited letters—on file in the American offices of the Club—attest to the extraordinary enthusiasm with which members receive their gifts.

The Case of the Famous Perfume Flacon

The petit Parisian perfume flacon is a good example of how club purchases are made. The Club's buyer in France discovered it in a small Paris studio. When he first saw this little gem of etched metal and glass, he instinctively knew it was "right" for discriminating American women.

So in due time, these hand-made flacons were purchased, packed *á la francais*, and mailed direct from Paris. Almost overnight, it became one of the most talked-about items the Club had ever distributed. The mail was tremendous. Thousands of smart American women wrote to congratulate the Club for selecting this delightful *frivolité de Paris*. Incidentally, the same item was later sold in one of New York's exclusive shops for twice the price paid by Club members. This story is typical of dozens of such Club purchases.

How to Join the Around-the-World Shoppers Club

A prospective member may join simply by sending his name and address to the American office of the Club, given below. Membership is free, and there are no charges other than for each monthly gift. All duty and postal charges are prepaid by the Club. (The United States Post Office Department charges 15¢ each for the delivery of small packages from foreign lands which cannot be prepaid.)

The Club may be joined on any of the following plans: 2 MONTHS MEMBERSHIP for $5.00, 4 MONTHS MEMBERSHIP for $9.00, 6 MONTHS MEMBERSHIP for $12.00, 12 MONTHS MEMBERSHIP for $22.00.

Bonus Gift to New Members

The Club also offers each new member a special Around-the-World Shoppers Club Bonus Gift *without charge* when he joins. This gift will be sent from a foreign country as soon as the new member's name is received overseas. The Club asks you to examine the gift carefully. If you decide not to join the Club after all, keep the Bonus Gift anyway. Notify the Club and you will receive a prompt refund of your payment!

You May Cancel Membership at Any Time

The tremendous growth of the Around-the-World Shoppers Club in recent months . . . the hundreds of letters from delighted members all over the nation—prove beyond doubt that the "armchair travelers" who belong to the Club know a wonderful bargain when they see one! The minute you unwrap your Bonus Gift from abroad, you will understand why the Club is so popular. You'll be amazed that such gifts can be sold for so little! However, you are free to cancel your membership at any time. (Please give 30 days' notice to allow for transmittal to the Club's offices abroad.) The unused portion of your payment will be refunded in full.

The Around-the-World Shoppers Club headquarters in the United States are located at 71 Concord Street, Dept. 506-X, Newark 5, New Jersey. You may join simply by sending your name and address, together with remittance for the term of membership desired, as explained above. Why not do it now, while an extra gift is being offered without extra charge to all new members.

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 755. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

SKYLIGHT GLASS blocks are of special optical design, scattering the light rays out into the far corners of the kitchen, library, workshop or studio. They are self-cleaning and almost impossible to break, as well as offering more insulation than ordinary skylights.

Science News Letter, December 4, 1954

PHONOGRAPH RECORD designed for distribution on a cereal carton is a 5¼ inch, 78 rpm record that can simply be cut from the box and played. Only .003 of an inch thick, you can throw it on the floor, step on it or rub it with the sole of your shoe and it still plays.

Science News Letter, December 4, 1954

TELEPHOTO LENS for the camera enthusiast is a 105mm f2.5. The magnification of the new lens is 200% over the 50mm lens normally used in 35mm photography. Provided with click stops and a depth-of-field scale, its focusing range is from 3½ feet to infinity.

Science News Letter, December 4, 1954

KALEIDOSCOPE RECORD-PLAYER creates a delightful and imaginative fantasia of color with each beat of the music. Synchronized with the electronic impulses of the 78, 45 or 33 1/3 rpm record being played, the multicolored interpretations of the music never repeat themselves. Housed in reinforced plastic, it is designed for nursery or playroom abuse and is shown in the photograph.

Science News Letter, December 4, 1954

TOY TUBA plays real music to satisfy junior's "oompah" desires. Golden-plated to look like its marching band's counterpart, it is made of a high-impact styrene plastic. The bell measures more than three feet around, and it has four feet of wrap-around horn.

Science News Letter, December 4, 1954

HIGH-SPEED FILM now makes it possible for amateur and professional photographer alike to take pictures indoors with existing light, or night sporting events without flash. Available in 35mm, 4 x 5 film pack or 620 and 120 roll film, it has an A.S.A. daylight-exposure index better than 200.

Science News Letter, December 4, 1954

HAMBURGER OVEN should be a boon to restaurants and hamburger stands alike. It uses radiant heat to cook the burgers and toast the rolls simultaneously. This stainless steel, fully-automatic oven can handle six hamburgers and rolls a minute.

Science News Letter, December 4, 1954

FIRE-RESISTANT DRAPERY fabric is best suited for institutional use. A combination of two individually fireproof yarns, this textile has been approved by safety experts as being "flame-proofed." It is woven with saran and a new man-made fiber.

Science News Letter, December 4, 1954

Do You Know?

Jellyfish are about 96.5% water, three percent salts and less than one percent protein.

The axolotl, a *salamander*, eats more than its own weight in a single meal.

A *duck hawk*, diving on its prey, often travels at 180 miles per hour.

The first *horse*, called eohippus, was about the size of a fox, and lived 60,000,000 years ago.

Tinted automobile *windshields* have been found to reduce visibility at night as much as 45%, depending on the degree of tinting.

Some 100,000 tons of *fish* are taken annually from the Great Lake of Cambodia in Indochina, an average of 26 tons per square mile of lake.

The rare, diminutive *key deer*, named for the Florida keys they inhabit, showed an estimated population in 1954 of 94; a herd of 200 is the minimum that will assure survival of the species.